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EXAMINER	
PHAM, THIERRY L	
ART UNIT	**PAPER NUMBER**
2624	6

DATE MAILED: 04/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/496,451	Applicant(s) DOWNING, STEVEN P	
	Examiner Thierry L Pham	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-31 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-31 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to the following communication: an Amendment filed on 1/20/04.

Response to Arguments

2. Applicant's arguments, see page 11, lines 6-17, filed 1/20/04, with respect to 112, first paragraph rejection have been fully considered and are persuasive. The rejection of claims 6-9, 12, 16, 22 and 29-30 has been withdrawn.

3. Applicant's arguments, see page 13, lines 15-25, filed 1/20/04, with respect to the rejection(s)of claim(s) 6 under 102 (b) rejection have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art references.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5, 10-11, 13-15, 25-28, 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Haselby et al (U. S. 4916638).

Regarding claims 1 & 13, Haselby discloses a method for high accuracy media positioning in a swath printer, comprising:

(1) mounting (mounting a printhead on a carriage, fig. 3, col. 2, lines 5-10) a computer-controlled printing element (printhead, col. 4, lines 30-48) for movement along a swath axis

(moving the printhead (nozzles) along the swath axis (horizontally), fig. 3) for swath printing of an image on a print medium;

(2) moving the print element along the swath axis and printing at least a portion (1st swath portion, fig. 10) of a swath of the image on the print medium;

(3) activating a media advance mechanism (media advance system for accurately advancing the print media upon the printing of a swath, col. 2, lines 22-48) to provide a nominal advance movement between the printing element and the print medium to position for a fresh swath;

(4) moving the printing element (moving the printhead/carriage along the swath axis, fig. 10) along the swath axis;

(5) sensing (sensing via dual line sensors, fig. 3) the position of an edge of a just printed portion (edge of 1st printed swath, fig. 15) of said image which is nominally aligned with the scan axis, wherein said edge is a bottom edge of a previously printed swath (edge of 1st printed swath, fig. 15) in relation to a direction of print medium advance through the swath printer past the print element;

(6) providing relative motion (media advance system for precisely position the media for the next successive swath, abstract and col. 2, lines 22-48) between the print medium and the printing element to accurately position the printing element in dependence on the sensed position of the edge of the just printed portion of the image to align the top edge of the next swath to be printed in relation to the bottom edge of the previously printed swath (figs. 11-23 shows dual sensors for sensing the edges of 1st and 2nd swaths to precisely position the printhead for printing the next successive swaths, abstract, col. 2, lines 22-48 and col. 9, lines 1-10).

Regarding claim 2, Haselby further discloses the method of claim 1 wherein said step of providing relative motion is carried out on the fly (col. 4, lines 1-48) as the portion of the image is being printed and the print element is moving in the scan axis.

Regarding claims 3 & 14, Haselby further discloses the method of claim 1, wherein the step of providing relative motion to accurately position the printing element in relation to the print medium is carried out between printing successive swaths (figs. 11-23 shows dual sensors

for sensing the edges of 1st and 2nd swaths to precisely position the printhead for printing the next successive swaths, abstract, col. 2, lines 22-48 and col. 9, lines 1-10).

Regarding claims 4 & 15, Haselby further discloses the method of Claim 1 wherein said step of providing relative motion between the print medium and the printing element is performed simultaneously (sensing and printing simultaneously, col. 4, lines 23-65) with the step of moving the printing element along the swath axis to print at least a portion of the fresh swath.

Regarding claim 5, Haselby further discloses the method of Claim 1 wherein: said providing relative motion between the print medium and the printing element is performed after printing a swath (sensing the edges of first printed swath to accurately position of the next swath to be printed, fig. 15, col. 4, lines 23-65) and before said moving the printing element along the swath axis to print at least a portion of a next swath.

Regarding claim 10, Haselby further discloses the method of Claim 1 wherein the step of providing relative motion between the print medium and the printing element includes incrementally moving the print medium in a direction transverse to the scan axis (fig. 10).

Regarding claim 11, Haselby further discloses the method of claim 1 wherein the printing element includes an ink-jet pen (ink-jet nozzles, col. 1, lines 23-27).

Regarding claim 25, Haselby discloses a method for swath printing, comprising:
(1) printing a first swath (1st swath, fig. 12) of an image on a print medium with an ink-jet printing structure (ink-jet, col. 1, lines 22-30);
(2) advancing (advances the media to the next swath, col. 39-48) the print medium to position the medium for printing a second swath;
(3) determining zones (sensors for sensing location of swaths, col. 2, lines 22-47 and col. 8, lines 60-67) of the second swath which need high accuracy swath alignment;
(4) begin printing the second swath (2nd swath, fig. 15);

(5) during said printing of the second swath, for those zones which need high accuracy swath alignment, determine the alignment errors (alignment errors, col. 2, lines 1-4) and store in memory appropriate error compensation values (advances the media to a position wherein the sensor provides an output signal equal to the reference value, col. 2, lines 38-48 and Abstract);
(6) after completing the printing of said second swath, calculate the next media advance distance based (advance media distance reference value, col. 9, lines 1-10) on the stored compensation values; and
(7) advancing the media (advances the media to a position wherein the sensor provides an output signal equal to the reference value, col. 2, lines 38-48 and Abstract) for the next swath to be completed by a distance dependent on said next media advance distance.

Regarding claim 26, Haselby further teaches a method for high accuracy media positioning in a swath printer, comprising:
(1) providing a print medium (print media, abstract);
(2) providing a computer-controlled printing element (printhead, col. 4, lines 30-48), the printing element mounted for movement along a swath axis to print a first swath on the print medium;
(3) moving the printing element (moving the printhead (nozzles) along the swath axis (horizontally), fig. 3) along the swath axis and printing at least a portion of a swath on the print medium, said swath having a leading edge and a trailing edge;
(4) providing relative motion (media advance system for precisely position the media for the next successive swath, abstract and col. 2, lines 22-48) between the printing element and the print medium to position for a fresh swath;
(5) sensing (sensing via dual line sensors, fig. 3) the position of the trailing edge of the just printed swath (bottom edge of 1st printed swath, fig. 12);
(6) providing relative motion (figs. 11-23 shows dual sensors for sensing the edges of 1st and 2nd swaths to precisely position the printhead for printing the next successive swaths, abstract, col. 2, lines 22-48 and col. 9, lines 1-10) between the print medium and the printing element to accurately position for the fresh swath in dependence on the sensed position of the trailing edge of the just printed swath to compensate for position errors between a nominal position of the trailing edge and the sensed position of the trailing edge of the just printed swath; and

(7) moving (moving the printhead (nozzles) along the swath axis (horizontally), fig. 3) the printing element along the swath axis to print at least a portion of the fresh swath.

Regarding claim 27, Haselby further discloses the method of Claim 26 wherein said step of sensing the position of the trailing edge and said step of providing relative motion between the print medium and the printing element is performed simultaneously (sensing and printing, col. 4, lines 23-65) with the step of moving the printing element along the swath axis to print at least a portion of the fresh swath.

Regarding claim 28, Haselby further discloses the method of Claim 26 wherein: said providing relative motion between the print medium and the printing element is performed after printing the first swath and before (sensing the edges of first printed swath to accurately position of the next swath to be printed, fig. 15, col. 4, lines 23-65) said moving the printing element along the swath axis to print at least a portion of the fresh swath.

Regarding claim 31, please see rejection rationale/basis as described in claim 1 above.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 6-9, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haselby et al (U.S. 4916638), and in view of Nguyen et al (U.S. 5297017).

Regarding claims 6 & 12, Haselby (U.S. 4916638) discloses a method for high accuracy media positioning in a swath printer, comprising:

(1) mounting (mounting a printhead on a carriage, fig. 3, col. 2, lines 5-10) a computer-controlled printing element for movement along a
swath axis for swath printing of an image on a print medium;

(2) moving (moving the printhead (nozzles) along the swath axis (horizontally), fig. 3) the printing element along the swath axis and printing at least a
portion of a swath of the image on the print medium;

(3) sensing (sensing via dual line sensors, fig. 3) the position of an edge of the just printed portion of said image
which is nominally aligned with the scan axis;

(4) providing relative motion between (media advance system for predetermining to precisely position the media for the next successive swath, abstract and col. 2, lines 22-48) the print medium and the printing element to accurately position the printing element in dependence on the sensed position of the edge of the just printed portion of the image (figs. 11-23 shows dual sensors for sensing the edges of 1st and 2nd swaths to precisely position the printhead for printing the next successive swaths, abstract, col. 2, lines 22-48 and col. 9, lines 1-10).

However, Haselby (US 4916638) does not explicitly disclose wherein providing relative motion comprising moving the printing element in a direction transverse to the swath axis.

Nguyen (US 5297017), in the same field of endeavor for swath printer, teaches a method for moving the printing element in a direction transverse to the swath axis (moving ink jet nozzles perpendicular to the swath axis (vertical alignment of ink jet nozzles of the printhead), fig. 3, abstract, col. 1, lines 60-67 to col. 2, lines 1-6 and col. 21, lines 40-50).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Haselby as per teachings of Nguyen because of a following reason: (1) to provide a better and an accurate position of the printhead for printing the next swath by moving the printing element transverse to the swath axis; (2) to avoid banding of the resulting or printed product (Haselby, col. 8, lines 10-30).

Therefore, it would have been obvious to combine Haselby with Nguyen to obtain the invention as specified in claim 6.

Regarding claim 7, Nguyen further teaches the method of Claim 6 wherein said step of mounting said printing element includes mounting the printing element in a movable carriage, and said moving the printing element in a direction transverse to the swath axis includes: positioning an actuating element (actuator 111, fig. 5, col. 2, lines 25-32 and col. 4, lines 50-67 to col. 1-37) between the printing element and the carriage; and driving the actuating element (cam actuator for adjusting vertical alignment, col. 5, lines 1-67) to move the printing element to obtain the accurate positioning.

Regarding claim 8, Nguyen further teaches the method of Claim 6 wherein said step of mounting the printing element includes mounting the printing element in a carriage (fig. 1) for sliding movement along a slider rod (slider rod 53, fig. 1), and said moving the printing element in a direction transverse to the swath axis includes: positioning an actuating element (actuator 111, fig. 5, col. 2, lines 25-32 and col. 4, lines 50-67 to col. 1-37) between the slider rod and the carriage; and driving the actuating element to move (cam actuator for adjusting vertical alignment, col. 5, lines 1-67) the carriage and the printing element to obtain the accurate positioning.

Regarding claim 9, Nguyen further teaches the method of Claim 6 wherein said step of mounting the printing element includes mounting the printing element in a carriage for sliding movement along a slider rod, and said moving the printing element in a direction transverse to the swath axis includes: positioning an actuating element (fig. 5) between the slider rod and a corresponding slider supporting structure; and driving the actuating element (cam actuator for adjusting vertical and horizontal alignment, col. 5, lines 1-67) to move the slider rod and with it the carriage and the printing element to obtain the accurate positioning.

8. Claims 16-22, 24, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haselby et al (U.S. 4916638) as applied to claim 1, 13 and/or 26 above, and in view of Nguyen et al (U.S. 5297017).

Regarding claim 16, Haselby (US 4916638) does not explicitly disclose wherein providing relative motion comprising moving the printing element in a direction transverse to the swath axis.

Nguyen (US 5297017), in the same field of endeavor for swath printer, teaches a method for moving the printing element in a direction transverse to the swath axis (moving ink jet nozzles perpendicular to the swath axis (vertical alignment of ink jet nozzles of the printhead), fig. 3, abstract, col. 1, lines 60-67 to col. 2, lines 1-6 and col. 21, lines 40-50).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Haselby as per teachings of Nguyen because of a following reason: (1) to provide a better and an accurate position of the printhead for printing the next swath by moving the printing element transverse to the swath axis; (2) to avoid banding of the resulting or printed product (Haselby, col. 8, lines 10-30).

Therefore, it would have been obvious to combine Haselby with Nguyen to obtain the invention as specified in claim 16.

Regarding claim 17, Nguyen further teaches the printer of Claim 16, wherein said fine positioning system includes an actuating element (cam actuator for adjusting vertical and horizontal alignment, fig. 5, col. 5, lines 1-67) between the printing structure and the carriage (cam adjusting actuator 111, fig. 5) to move the printing structure to obtain the accurate positioning.

Regarding claims 18-19, Nguyen further teaches the printer of Claim 16, wherein said carriage is mounted for sliding movement along a slider rod (slider rod 53, fig. 5), and said fine positioning system includes an actuating element (cam adjusting actuator 111, fig. 5) disposed between the slider rod and the carriage to move the carriage and the printing structure to obtain the accurate positioning.

Regarding claim 20, Haselby further teaches the printer of Claim 16 wherein the fine positioning system incrementally moves the print medium in a direction transverse to the scan axis (fig. 10).

Regarding claim 21, Haselby further teaches the printer of claim 16 wherein the printing structure includes an ink-jet pen (ink jet nozzles, col. 1, lines 5-27).

Regarding claim 22, Nguyen further teaches the printer of Claim 13 wherein the printing element includes a plurality of ink-jet pens (i.e., pens C1 and C2, fig. 5, col. 34-45) mounted in a carriage, and wherein said fine positioning system includes an actuating element mounted between each said pen (cam follower 97, fig. 4) and said carriage for moving the respective printing elements in a direction transverse to the swath axis (moving the pen nozzles vertically, fig. 4, col. 6, lines 52-67 to col. 7, lines 1-10).

Regarding claim 24, Nguyen further teaches the printer of Claim 13 wherein the sensor system includes a first sensor mounted on a first side of the carriage and a second sensor mounted on a side of the carriage opposite the first side along the swath axis, the sensor system adapted for bidirectional sensing operation. Nguyen teaches an example of mounting an optical sensor adjacent to the printhead (col. 5, lines 55-62). One of ordinary skill in the art would mount the first sensor on a first side and a second sensor on the second side (opposite to the first) to precisely adjust the printhead to an appropriate position for printing the next swath.

Regarding claim 29, please see rejection rationale/basis as described in claim 16 above.

9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haselby et al (U.S. 4916638) as applied to claim 13 above, and in view of Yoshino (U.S. 5479062).

Regarding claim 23, Haselby does not explicitly teach wherein an fine position system includes a piezoelectric actuator for providing the incremental relation motion.
Yoshino, in the same field of endeavor for printing, teaches a printer using a piezo actuator (fig. 5, col. 1, lines 5-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Haselby as per teachings of Yoshino because of a following reason: (1) to provide higher speed actuating element for printer (Yoshino, col. 1, lines 10-12).

Therefore, it would have been obvious to combine Haselby with Yoshino to obtain the invention as specified in claim 23.

10. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haselby and Nguyen as described in claim 16 and/or 29 above, and further in view of Yoshino (U.S. 5479062).

Regarding claim 30, the combination of Haselby and Nguyen do not explicitly teach wherein a fine position system includes a piezoelectric actuator for providing the incremental relation motion.

Yoshino, in the same field of endeavor for printing, teaches a printer using a piezo actuator (fig. 5, col. 1, lines 5-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Haselby as per teachings of Yoshino because of a following reason: (1) to provide higher speed actuating element for printer (Yoshino, col. 1, lines 10-12).

Therefore, it would have been obvious to combine Haselby with Yoshino to obtain the invention as specified in claim 30.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thierry L Pham whose telephone number is (703) 305-1897. The examiner can normally be reached on M-F (9:30 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on (703)308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thierry L. Pham

TP

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PRIMARY EXAMINER